



National Aeronautics and  
Space Administration



Aeronautics

# System for Repairing Cracks in Structures

Thermally Activated Crack Healing Mechanism for  
Metallic Materials

NASA Langley Research Center has developed an innovative coating to heal cracks in metal components, such as in aircraft and bridges. Currently the coating is used for in-laboratory repairs of surface cracks. Development continues with the ultimate goal of an in-situ healing mechanism that can work autonomously with structural health monitoring detectors.

## BENEFITS

- ➔ Heals cracks in metals
- ➔ Improves structural reliability and safety
- ➔ Reduces inspection, repair, and replacement costs
- ➔ Extends working life of structures
- ➔ Coating format works well with current aircraft practices

## APPLICATIONS

- ➔ Aerospace
- ➔ Transportation Infrastructure

technology solution

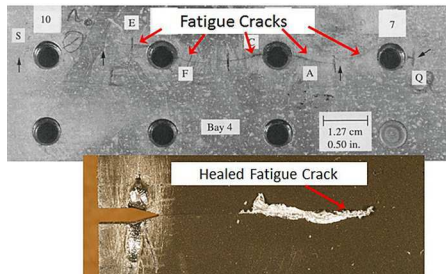


# NASA Technology Transfer Program

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## THE TECHNOLOGY

The metal structure is coated with a low-temperature healing agent and when a crack is produced under cyclic load it is then subjected to an external heat source (to heat the healing film to 250F - 300F). The component is processed in a vacuum. The coating has been prototyped on a titanium alloy sheet with an indium-tin eutectic alloy coating. Development is ongoing to produce a coating that does not require a vacuum and utilizes an integrated heat source.



Multiple cracks in an aircraft skin

## PUBLICATIONS

Patent No: 8,347,479; 8,679,642

Patent Pending



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